

Studies on the New Zealand Amphipodan Fauna

No. 8. Terrestrial Amphipods of the Genus *Talitrus* Latr.¹

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INTRODUCTION

TERRESTRIAL AMPHIPODS belong to the crustacean family Talitridae and are of particular interest to Pacific workers as they are endemic to the Indo-Pacific region. Several of the species, especially the genus *Talitrus*, have been described first from material collected in Europe but without exception these collections have been from public gardens or hothouses where they have obviously been introduced accidentally by human agency.

During systematic studies on the New Zealand Talitridae, particular attention was paid to the terrestrial species. A surprisingly large number of species belonging to several genera occur in New Zealand and form an important element of the leafmould fauna. Most of these belong to the genera *Orchestia* and *Talorchestia* and will be reported on elsewhere. However, one species of *Talitrus* was found to be very common on both islands. This species is here described and figured. In order to clarify its systematic position it was necessary to examine material from other Pacific countries and some confusion in previous identifications was revealed. With the assist-

ance of material not available to previous workers it has been possible to make a number of corrections which are detailed below.

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Genus TALITRUS Latreille, 1802

Latreille, 1802: 148 (partim).

Stebbing, 1906: 521.

Barnard, 1916: 222.

Hunt, 1925: 854-863.

Carl, 1934: 746-747.

Schellenberg, 1934: 159.

Burt, 1934: 181-191.

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Barnard, 1940: 463.

Schellenberg, 1942: 142.

Reid, 1947: 18.

Ruffo, 1947: 120.

Ruffo, 1948: 206.

The following generic description, taken from Burt (1934), is slightly amplified. The entomological terms which Burt used have been changed for the sake of uniformity.

Antenna 1 shorter than peduncle of antenna 2. Maxilla 1 with palp minute, rudimentary or absent. Maxilliped with palp of three segments, or with rudiment of 4th segment. First gnathopod simple and second feebly chelate in both sexes. Second gnathopod with merus produced distally, and propod produced beyond minute dactylos. Telson entire or emarginate. Uropods 1 and 2 biramous, uropod 3 uniramous.

The genus *Talitrus* Latreille (1802) was based in part on a species originally named *Oniscus locusta* by Pallas in 1776 (*vide* Stebbing, 1888). Montagu (1808) proposed the new name *saltator* for this species since he considered the specific name *locusta* had been wrongly applied and was no longer available. This species, *Talitrus saltator*, although credited to Montagu, remains the type of the genus formulated by Latreille.

The genus *Talitrus* is essentially defined by the simple first gnathopod and feebly chelate second gnathopod in both sexes, the minute palp of the first maxilla, the absence of more than a rudimentary 4th segment to the maxilliped palp, the entire or emarginate telson, and the uniramous 3rd uropod.

Early definitions were found somewhat too restricted for the reception of certain new species. As a result, several new genera and subgenera have been proposed in later years. This has led to considerable confusion at the generic level.

The genus *Talitroides* was erected by Bonnier (1898) for a species of *Talitroides* later named *Talitroides bonnieri* by Stebbing (1906). Stebbing redefined *Talitroides* with *T. bonnieri* as type species, the genus being char-

acterised by pleopods 1 and 2 in which the inner ramus was "rudimentary, reduced to a simple tubercle" and pleopod 3 which consisted "of a small process representing the peduncle without rami." Schellenberg (1934) has indicated that *T. bonnieri* is probably a synonym of *Talitrus alluaudi* Chevreux, 1896, and that Bonnier himself was of this opinion. Bonnier's material has been lost.

Methuen (1913) erected the genus *Talitriator* for *Talitriator eastwoodae*, a new species from Transvaal, with the following generic diagnosis: "Like *Talitrus* except for the fifth sideplate and the following characters:—Antennule is slightly shorter than peduncle of antenna. The 4th joint of the maxilliped is present. Gnathopod I not as long as gnathopod II and not stronger; fifth joint strong and swollen." Barnard (1916) transferred *Talitrus sylvaticus* Haswell and *Talitrus kershawi* Sayce to *Talitriator*.

Hunt (1925) was of the opinion that, although there were some differences which set *Talitrus saltator* apart from the species then assigned to *Talitroides* and *Talitriator*, there was no justification for retaining *Talitriator*. Accordingly, he redefined *Talitrus* to include *Talitriator*. Neither Hunt nor Barnard (1916) mention *Talitroides*.

Schellenberg (1934) has pointed out that *Talitroides* and *Talitriator* are synonymous, and has suggested that *Talitroides*, which has priority, should be retained as a genus for the terrestrial species.

Burt (1934) redefined *Talitrus* as given above with two subgenera, *Talitrus* (*Talitrus*) and *Talitrus* (*Talitropsis*). The latter is based on his new species, *Talitrus* (*Talitropsis*) *topitotum*, and is distinguished from *Talitrus* (s.s.) by the following characteristics: "Maxillary palp absent. Second gnathopod stronger than the first gnathopod. Oostegites small, flat, distally rounded, borne on coxopodites of second gnathopod to third peraeopod inclusive. Branchiae borne on coxopodites of second gnathopod to fourth peraeopod inclusive."

Barnard (1940) considered *Talitropsis* a synonym of *Talitroides*, which should be ranked either as a separate genus, *Talitroides*, or as a subgenus, *Talitrus* (*Talitroides*). He states, "I suggest therefore that the maxilliped palp and the 2nd joint of pereopod 3 be regarded as the diagnostic features of *Talitrus* (s.s.) and that, following Schellenberg, all the other species be grouped together either generically or subgenerically." Schellenberg (1942), Stephensen (1943) and Reid (1947) accept *Talitrus* and *Talitroides* as separate genera. Reid gives a further characteristic which he states can be used to separate *Talitrus saltator*, "the only member of its genus," from the species of *Talitroides*—some of the flagellar segments of the second antennae of *T. saltator* are toothed.

I find myself most in accord with the view expressed by Ruffo (1947) who points out that terrestrial and littoral species occur in other genera (*Orchestia*, *Talorchestia*). If *Talitrus* and *Talitroides* are going to be separated on what, because of the scanty morphological differences, are essentially ecological grounds, then logically these other genera should be treated in the same way. He quotes, as evidence of the unreliability of these morphological grounds for separation, the case of *Talitrus gulliveri* which is morphologically intermediate between the *Talitrus* and *Talitroides* species. In other words, the morphological distinctions break down in practice. Because of this, he suggests that *Talitroides* be reduced to subgeneric rank to include all species of *Talitrus* living a typically terrestrial life, with the pleopods more or less reduced, and with the maxilliped palp elongated and not rich in spines.

In this paper I draw attention to the maxilliped palp of *Talitrus pacificus* n. sp. which is also intermediate between that of *T. saltator* and those of the typical terrestrial species, serving further to emphasize Ruffo's argument. If his suggestions are adopted, then *T. pacificus* can be considered as belonging to the subgenus *Talitroides* on ecological grounds.

This is the course I have adopted. I have accepted Burt's definition of the genus as the most suitable in that it adequately defines the genus and yet does not unduly limit it. Ruffo's proposals ensure that the distinctness of *T. saltator* from most other species in the genus is recognised without creating genera which, in my opinion, are not justified either in practice or in theory.

Key to Species of *Talitrus*

1. Maxilliped palp richly spinose; outer plate of maxilliped spinose distally and along inner margin; pleopods well developed; antenna 2 with some flagellar segments toothed; littoral.....
.....*saltator* (Montagu)
- Antenna 2, flagellar segments smooth; terrestrial; other characteristics not combined as above.....2
2. Large inter-ramal spine of uropod 1 with terminal spur.....3
Inter-ramal spine of uropod 1 simple or absent; peduncle of uropod 3 with 1 or 2 spines.....4
3. Inter-ramal spine of uropod 1 has small needle-like accessory blade at base of terminal spur; peduncle of uropod 3 has 3 spines.....*pacificus* n. sp.
Inter-ramal spine of uropod 1 has no accessory blade.....*decoratus* Carl
4. Peduncle of uropod 3 has 2 spines....5
Peduncle of uropod 3 has 1 spine.....7
5. Pleopod 3 reduced so outer ramus a small conical tubercle with single long terminal seta, inner ramus a barely recognisable rudiment; uropod 1, both rami without dorsal spines; telson with 4 or 5 spines on each lateral margin....*topitotum* Burt
Not as above; rami of pleopod 3 reduced but not less than half length of peduncle; uropod 1, dorsal spines on at least one

- ramus; telson with 2 spines on lateral margin.....6
6. Gnathopod 1, carpus expanded; basos of pereopod 3 comparatively narrow.....
.....*eastwoodae* (Methuen)
- Gnathopod 1, carpus linear; basos of pereopod 3 comparatively broad.....
.....*africanus* (Bate)
7. Pleopod 3 vestigial or absent.....8
- Pleopod 3, both rami present, though small.....10
8. Third epimeral plate, anterolateral border produced into acute triangular projection; outer plate of maxilliped apically pointed, with tuft of setae on outer margin of outer plate as well as at tip.....
.....*kershawi* Sayce
- Third epimeral plate, anterolateral border evenly rounded; outer plate of maxilliped not exactly as above.....9
9. Posterior border of 3rd epimeral plate minutely serrate and straight; maxilliped outer plate apically pointed, as in *T. kershawi* but lacking setae on outer margin.....*sylvaticus* Haswell
- Posterior border of 3rd epimeral plate not serrated, sigmoid; maxilliped outer plate terminally rounded...*alluaudi* Chevreux
10. Gnathopod 1, propod medially expanded, longer than carpus; epimeral plates, posterior margins sigmoid, serrated; inner ramus of pleopod 3 more than half peduncle length.....*tasmaniae* Ruffo
- These characteristics not combined as above.....11
11. Pleopods, rami only about half peduncle length; propod of gnathopod 1 linear, shorter than carpus; posterior border of 3rd epimeral plate straight and smooth.....*hortulanus* Calman
- Pleopods, rami about as long as peduncle; propod of gnathopod 1 linear, $\frac{2}{3}$ carpus length; posterior border of 3rd epimeral plate not described but probably not as above.....*gulliveri* Miers
- One species only, *Talitrus sylvaticus*, so far is known from New Zealand.
- Talitrus* (*Talitroides*) *sylvaticus***
Haswell, 1880
Figs. 1, 2
- Talitrus sylvaticus* Haswell. Haswell, 1880: 246, pl. 7, fig. 1. Stebbing, 1906: 524 (literature). Sayce, 1909: 30–32, pl. XI. Chilton, 1916: 83–86. Hale, 1929: 218–219, fig. 216. Ruffo, 1948: 206–207.
- Talitrus dorrieni* Hunt. Hunt, 1925: 854–869, text-figs. 1–2; pl. 1–2. Rawlinson, 1937: 589–592.
- Talitroides dorrieni* (Hunt). Schellenberg, 1934: 159–160. Reid, 1947: 19–20, fig. 10.
- Talitroides sylvaticus* (Haswell). Stephensen, 1943: 296.
- [non] *Talitrus sylvaticus* Haswell. Stephensen, 1935: 19–24, figs. 1–3. Shoemaker, 1936: 62–64, figs. 1–2. Schellenberg, 1942: 142–144, figs. 116–117.
- Description of Male*
- Colour, in spirits, white. Eyes round, apart, black. In all details the female is very like the male.
- ANTENNAE. *First*: Length $1\frac{1}{4}$ mm.; reaching $\frac{1}{3}$ along last peduncle segment of second antennae. Flagellum as long as peduncle, of 7 segments each with group of small setae mediodistally, 2 short spines inferodistally. Peduncle segments successively narrower and longer, margins sparsely spined. *Second*: Length 5 mm.; flagellum longer than peduncle, of 23–33 segments each with 4 equidistant spines around end; last segment tufted. Peduncle, 3rd segment $\frac{1}{2}$ length 4th; 4th $\frac{1}{2}$ 5th; segments finely spined and successively narrower.

MOUTH PARTS. *Upper Lip:* Finely setose distally. *Lower Lip:* Inner lobes vestigial; inner and end margins of principal lobes strongly bristled. *First Maxillae:* Inner plate the shorter. Palp minute with only barest suggestion of a 2nd segment. *Second Maxillae:* Plates subequal, distally setose. *Left Mandible:* Molar process has large setulose spine on inner proximal margin; spine-row of 4 setose spines; cutting edge of 3 plates, upper with 3 teeth, lower of 4, median of 2. *Right Mandible:* Cutting edge, upper plate of 4 teeth, accessory U-shaped, upper edge of U fimbriated and lower with 4 or 5 teeth. *Maxilliped:* Dactylos rudimentary. Inner and outer plates well-developed, inner with 3 stout teeth on end, a spine between each tooth, 2 pairs of plumose setae down cleft. Outer plate reaching $\frac{1}{2}$ along carpus, distally sickle-shaped and prolonged to fine tip tufted with setae, convex outer margin naked; 4 sets of 1 or 2 spines on inner margin, a pair on outer surface at merus level. Carpus as long as propod, merus shorter and wider, 2 or 3 long spines on outer distal angle of each; groups of fine setae on inner distal angles; inner surface of merus and carpus shallowly concave; small dome-like and seta-tipped dactylos ringed by 5 or 6 spines on end of propod.

GNATHOPODS. *First:* Sideplate ovate-rectangular, ventrally and posteriorly spined. Basos width $\frac{1}{4}$ length, a few small spines anteriorly, 2 or 3 large stout spines posteriorly and at distal angle. Ischium subsquare, as wide, spined posterodistally. Merus subtriangular, a little longer than ischium, small scabrous pellucid lobe and 4 or 5 spines on posterior margin; anterior contiguous with proximal half of carpus posterior margin. Carpus subtriangular, almost twice size of merus, spined anteriorly and posteriorly; posterodistally expanded into slightly scabrous and pellucid lobe; row of about 6 spines obliquely across posterodistal surface. Propod slightly shorter and narrower than carpus, narrowing further to long curved dactylos; 3 sets of 2 or 3

spines on anterior margin, posterior and end margins strongly spined. Dactylos $\frac{1}{2}$ propod length, has spine on inner margin. *Second:* Sideplate subsquare, ventrally and posteriorly spined, posteriorly excavate. Basos width about $\frac{1}{4}$ length, anterior margin and posterodistal angle spined. Ischium subrectangular, width $\frac{1}{2}$ length, posterodistally spined. Merus subrectangular, as long and wide as ischium, posterodistally produced to scabrous pellucid lobe, with 1 or 2 spines either side. Carpus wider, about twice as long, anteriorly convex, 1 or 2 spines on distal angle; posterior margin expanded to scabrous pellucid lobe, about 5 long spines along lobe base. Propod longer and narrower, with scabrous pellucid posterior margin produced in distal lobe beyond end of dactylos; 1 or 2 spines on anterior margin, 2 or 3 on anterodistal angle, a double row of spines medially along surface. Dactylos small, palm slightly oblique, pair of spines at inner base of dactylos and dactylos tip.

PERAEOPODS. *First:* Sideplate subrectangular, posteriorly excavate, ventrally and posteriorly spined. Basos width about $\frac{1}{3}$ length, margins spined. Ischium subsquare, posterodistally spined. Merus as wide, about 3 times as long, a few spines anteriorly, quite strongly spined posteriorly. Carpus about $\frac{2}{3}$ merus length, narrower, similarly spined. Propod longer, narrower, similarly spined. Short curved dactylos has spine on inner margin. *Second:* Segments shorter and narrower than in Pr. 1; otherwise similar. *Third:* Anterior lobe of sideplate larger than posterior; small spines ventrally and posteriorly on each margin. Basos ovate, narrowing distally, margins spined, those on anterior margin the stronger; other segments stouter than in Pr. 1, propod and dactylos longer, spines stouter. *Fourth:* Longer than Pr. 3. Basos further expanded, segments comparatively longer than in Pr. 3, otherwise similar. *Fifth:* Much the longest; basos nearly as broad as long, posterior margin finely serrate and minutely spined.

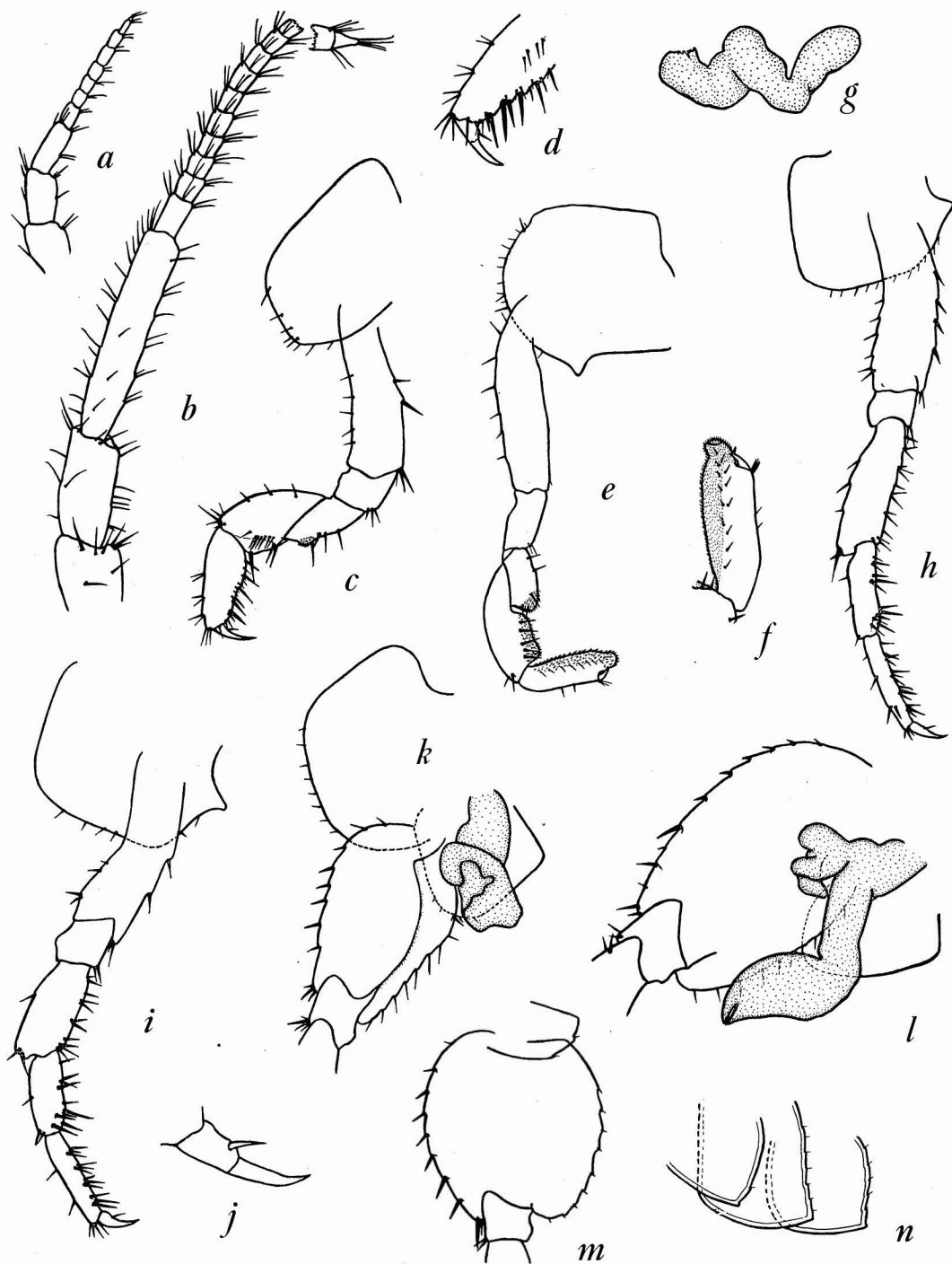


FIG. 1. *Talitrus sylvaticus* Haswell. *a*, Antenna 1; *b*, antenna 2; *c*, gnathopod 1, ♂; *d*, gnathopod 1, ♀, propod and dactylos; *e*, gnathopod 2, ♂; *f*, gnathopod 2, ♂, propod and dactylos; *g*, gill of gnathopod 2; *h*, peraeopod 1; *i*, peraeopod 2; *j*, peraeopod 2, dactylos; *k*, peraeopod 3, sideplate, basos and gill; *l*, peraeopod 4, sideplate, basos and gill; *m*, peraeopod 5, sideplate and basos; *n*, epimeral plates.

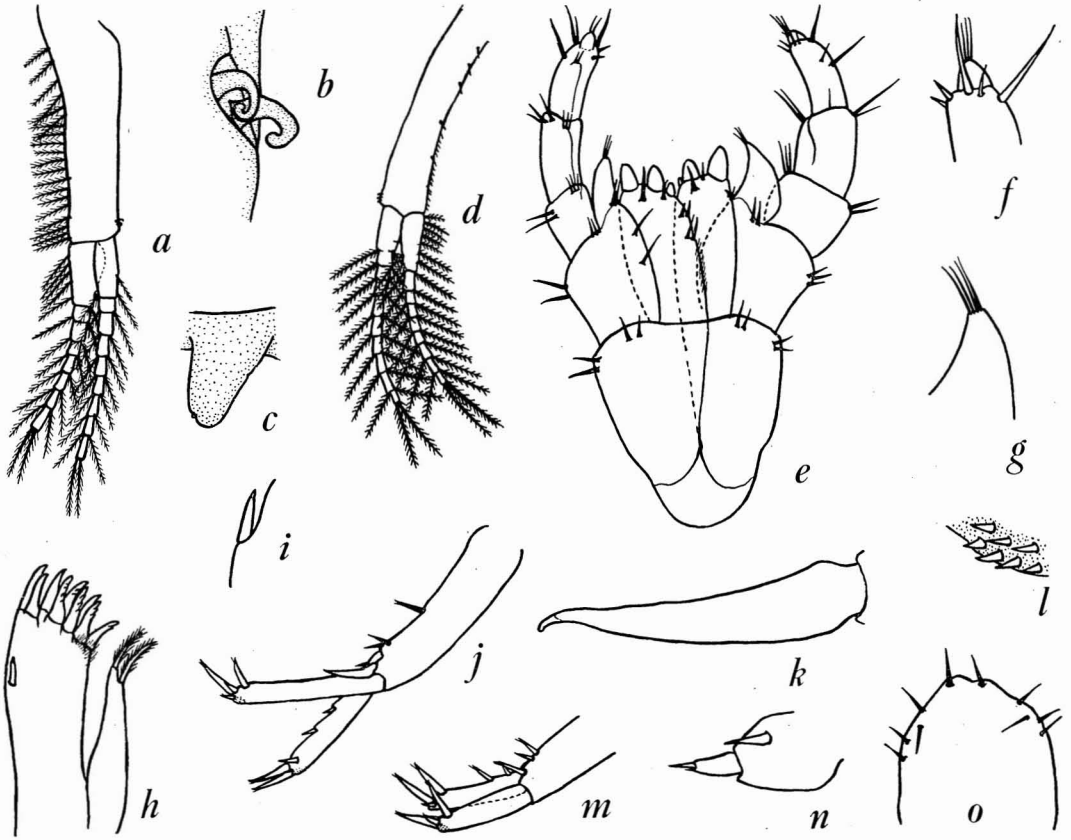


FIG. 2. *Talitrus sylvaticus* Haswell. *a*, Pleopod 1; *b*, pleopod 1, coupling spines; *c*, pleopod 3; *d*, pleopod 1 of Australian specimen; *e*, maxilliped; *f*, maxilliped, tip of palp; *g*, maxilliped, end of outer plate; *h*, maxilla 1; *i*, maxilla 1, palp; *j*, uropod 1; *k*, uropod 1, inter-ramal spine; *l*, uropod 1, minute spines from end of rami; *m*, uropod 2; *n*, uropod 3; *o*, telson.

GILLS. That of gnathopod 2 is **S**-shaped and directed across sideplate rather than suspended pendulously; those of Pr. 1 and 2 are simple, pendulous, as long as basos; that of Pr. 3 somewhat **S**-shaped; that of Pr. 4 large, goose-necked, with cleft tip.

EPIMERAL PLATES. Small setae on posterior margins; 1st with ventral angle obtuse, hind margin slightly convex; 2nd and 3rd with straight posterior margins, posterodistally right-angled.

PLEOPODS. *First and Second:* Biramous, peduncle and rami subequal, outer ramus of 8 distinct segments, inner of 9, each with pair

of long plumose setae; peduncle outer margin with plumose setae also; 2 coupling spines. Third pleopod a vestigial triangular stump.

UROPODS. *First:* Peduncle longer than rami, 2 or 3 spines dorsally, a long simple spine between rami; inner ramus with 4 spines dorsally; 1 long, 2 medium and 2 short end spines; outer ramus with 2 long and 2 short end spines, none dorsally. *Second:* Rami as long as peduncle which has 3 dorsal spines; inner ramus has 2 dorsal spines, 2 long and 3 short end spines; outer has a short and 2 long end spines, none dorsally. *Third:* Ramus much smaller than 1-spined peduncle, 1 long and

1 short spine at ramus tip. *Telson*: Longer than broad, end and side margins spined, slightly emarginate.

HYPOTYPES. Slides 31, male; 32, female (specimen of 14 mm. length); from Hurleyville.

LOCALITIES. Hurleyville, Taranaki, coll. 28/1/49, D.E.H.; from sawdust under wood-heap near hedge of *Aeliagnus japonica*, later found abundant under hedge also. Karori, Wellington, under rotting grass, coll. B.M. Bary, 6/4/48. Waipuna Valley, Te Kauwhata, coll. A. J. Healy, 3/5/48. "N. W. of Taupiri," coll. A. J. Healy, 5/5/48. Ruby Bay, Nelson, leaf-litter, coll. H. Tyndal-Biscoe, 1953.

DISTRIBUTION. New Zealand; Australia; Scilly Isles; Ireland.

REMARKS. These specimens undoubtedly belong to the same species as those described by Hunt (1925) from Tresco Abbey Gardens in the Scilly Isles. Since Major Dorrien-Smith, who collected the specimens in the Gardens, seems also to have been responsible for the introduction of many New Zealand plants to the Island (cf. Booknotes in *Countryside*, summer, 1951: 92), it seems not improbable that the animals were introduced from New Zealand with the plants. Major Dorrien-Smith has also collected two species of New Zealand stick insects from the same gardens (Uvarov, 1950).

The number of localities from which the species has been taken in New Zealand and their distances apart indicate that the species is endemic. Some were undoubtedly near human habitation in conditions similar to those under which the introduced wood louse, *Porcellio scaber*, is found, but the Waipuna Valley specimens come from second-growth fern and bracken in eroded back country well away from any habitation.

The only differences from Hunt's specimens are in the wider variation of antennal segment numbers which is not significant.

Australian specimens (Fig. 2*d*) differ slightly in lacking plumose setae along the pleopod peduncle. The species is easily recognised by its very distinctive and rather bare maxilliped, and the equally distinctive cleft-tip gill of the fourth pereopod. This gill is large and conspicuous.

Two quite different species have been confused under the name *Talitrus sylvaticus* Haswell. This is not difficult to prove, but it is not simple to assign correctly the specimens recorded by various authors and, of more importance, to determine the correct application of the name *sylvaticus* as proposed originally by Haswell. Because of the tangled and circumstantial nature of much of the evidence involved, a lengthy discussion seems justified.

In my opinion *Talitrus sylvaticus* as defined by Hunt is not specifically distinct from *Talitrus dorrieni* as defined by the same author, both being identical with *Talitrus sylvaticus* Haswell. Specimens of *Talitrus* described and figured by Stephensen (1935) and Shoemaker (1936) as *Talitrus sylvaticus* belong to an entirely different heretofore unrecognised species.

The Identity of Talitrus sylvaticus Haswell and Talitrus dorrieni Hunt

In 1880 Haswell described *Talitrus sylvaticus*, a species of amphipod "abundant on moist ground in wood and scrub of New South Wales." Sayce (1909) amplified Haswell's description. Hunt (1925) described *Talitrus dorrieni*, a terrestrial amphipod from the Scilly Isles which he supposed had been introduced from the tropics. He separated it from *Talitrus sylvaticus* on several counts, notably the shape of the 1st and 2nd pleopods. Hunt described *T. dorrieni* as having "1st and 2nd pleopods, rami distinctly segmented, inner ramus the longer, outer border of the peduncle clothed with long feathered setae" and *T. sylvaticus* "1st and 2nd pleopods, rami not distinctly segmented, outer ramus the

longer, outer border of the peduncle clothed with short single hairs." There were other differences—the telson of *T. dorrieni* was more spinous; the tip of the maxilliped outer plate had a long tapering tuft of setae and not a simple transverse row of short bristles as in *T. sylvaticus*; the fifth joint of the 1st gnathopod was prominently rather than minutely lobed, and the palp of the maxilla was "smaller and without a trace of a second joint."

Hunt has some very penetrating remarks to make on the "puzzling discrepancy" between accounts of the pleopods referred to by Calman (1912) and shows that specimens recorded by Chevreux (1901) belong to a different species. I have examined several species of New Zealand terrestrial amphipods showing degeneration of pleopods to a marked extent and I believe that in these species the shape of the pleopods is much more constant than the earlier literature would lead one to expect. Carl (1934) and Schellenberg (1934) also hold this view. Nevertheless, it would be foolish to base specific identifications on the pleopods alone except where other evidence is entirely lacking, as in fragmentary specimens.

Hunt notes these differences in pleopods between *T. sylvaticus* and *T. dorrieni*: (1) the peduncle in *T. sylvaticus* is "clothed with short simple hairs," in *T. dorrieni* it has "long feathered setae;" (2) the rami in *T. sylvaticus* are not distinctly segmented, in *T. dorrieni* they are; (3) the inner ramus of *T. dorrieni* is the longer, in *T. sylvaticus* the shorter. The value of these distinctions is somewhat lessened when one takes into account Barnard's descriptions of the various races of *Talitroides eastwoodae*. His *f. typica* has "pleopods with rami subequal, numerous close-set plumose setae along the whole length of the peduncle, and the rami more or less distinctly subjointed." In *f. cylindripes* the rami are "more or less distinctly unequal (the outer the longer), not jointed." In *f. calva* the "peduncle of pleopods non-setose, the rami unjointed, but the incisions marking the limits of the fused

segments very deep, so that the ramus becomes a series of subglobose segments." Here we have all the variations necessary to link Sayce's (or Calman's) *T. sylvaticus* with Hunt's *T. dorrieni*. And also the variation in the proportions of segments 5 and 6 in gnathopods 1 and 2 noted by Hunt and Calman is surely very similar to that figured by Barnard for the forms of *T. eastwoodae*.

Chilton's Australian specimens also support the opinion that *T. dorrieni* Hunt is identical with *T. sylvaticus* Haswell. My New Zealand specimens, like Hunt's, have plumose setae on the peduncle. The Australian specimens, which agree with mine in all other respects, have short simple bristles or nothing at all along the peduncle. Only one specimen has the rami nonsegmented; it has the outer ramus, as in all of the Australian specimens, the longest; it lacks plumose setae along the peduncle (all Hunt's conditions for *T. sylvaticus*) but it agrees with *T. dorrieni* in both maxilliped and uropod 3 (of this more later). The Australian specimens also differ from Hunt's in numbers of segments to the rami. In short, there seems to be wide variation in pleopod ornamentation. I would point out, though, that the essential shape of the pleopods is the same: first and second biramous, third one-segmented and vestigial. And, as far as I can see, there is no difference in pleopods in the published accounts of Haswell (1880), Sayce (1909), Calman (1912), Chilton (1916) or Hunt (1925).

The palp of the first maxilla in *T. dorrieni* certainly has not an obvious second segment, but Sayce's "vestige of [a] second [segment]" could apply.

In all the specimens I have examined, the number of spines on the telson varies between 3 and 5 to each margin. This leaves only one point of real value—the shape of the maxillipeds. The form of the maxillipeds in terrestrial Talitridae is remarkably constant. The figure in Haswell's 1880 paper is very poor and of no real use. However, he describes the plate as "ending in a single tooth." If

Figures 2e and 3a of this paper are compared, I think there is little doubt as to which this description applies. Add what I consider the operative phase of Sayce's description of the maxillipeds, "outer masticatory plates small, each broad proximally, but rapidly narrowing to a bluntly pointed apex directed obliquely inwards and bearing, submarginally, a single transverse row of short stiff setae" and Sayce's figures of the maxilliped, and it is difficult to find any significant difference between Haswell's, Sayce's or Hunt's specimens. Furthermore Chilton (1916) also figures the maxilliped of an Australian specimen of *T. sylvaticus* and says that his specimen "agrees very closely with Sayce's description." Schellenberg (1934) records *T. dorrieni* from New South Wales, Australia.

Dr. Keith Sheard informs me that no types of Haswell's material exist. "Some of the specimens are labelled as types but they were added, either by Haswell or by other workers, at a much later date." Sayce's material seems likewise to be absent. A specimen of Haswell's from Elizabeth Bay which Dr. Sheard kindly examined for me agrees with *T. dorrieni*.

For all of these reasons I consider the maxillipeds of *T. dorrieni* Hunt and *T. sylvaticus* Haswell identical and *T. dorrieni* Hunt to be a synonym of *Talitrus sylvaticus* Haswell. Hunt's arguments could possibly be advanced for giving *T. dorrieni* subspecific rank.

Thomson (1892) figures *T. sylvaticus* from Tasmania and notes its differences from Haswell's specimens. Thomson's specimens agree in having the 3rd pleopod vestigial, but his description of the 4th peraeopod gill and the maxilliped suggest some differences. Unfortunately, it is difficult to say from the figures whether the differences are specific or not—the lack of spines on the inner margin of the maxilliped outer plate suggests that Thomson's specimens differ from Hunt's *T. dorrieni* and, by inference, from Haswell's specimens, but the difference may perhaps be due to faulty drawings. Whatever species Thomson's specimens belong to, they are certainly not

identical with *Talitrus tasmaniae* Ruffo (1948), as one might have expected.

The Identity of Talitrus sylvaticus as defined by Hunt and Talitrus sylvaticus as defined by Stephensen

The literature after 1925 tends to obscure the facts on which Hunt based his new species, *T. dorrieni*. However, examination of Chilton's material in the light of these papers helps clarify the vexing synonymy. All of Chilton's material, with the exception of a Norfolk Island specimen, is from Australia. There appear to be five distinct species included in the collection under the label "*Talitrus sylvaticus*." These are:

Talitrus kershawi Sayce (1909).

Talitrus sp. from Central Creek (fragments only).

Talitrus sylvaticus Chevreux. cf. Hunt, 1925.

Talitrus sylvaticus Haswell (*T. dorrieni*, Hunt).

Talitrus sylvaticus Stephensen, 1935.

Talitrus kershawi is easily distinguished by the outer plate of the maxilliped, the gills of the fourth peraeopod, and the third epimeral plate, although in these specimens the last is not easy to discern. (See Fig. 4.)

The Central Creek specimen is quite unlike any of the other four species in the third epimeral plate, about the only fragment of the animal left which is of any specific value.

The Chevreux species is figured in part by Hunt (1925, text-fig. 5) who states that the specimen concerned "definitely. . . does not belong to the species in question (*T. sylvaticus*), if indeed to the genus *Talitrus*." Chevreux's specimens were obtained for him from Tasmania by Chilton. I assume that the only specimens labelled *T. sylvaticus* from Tasmania in Chilton's collection are from the identical locality and collection as Chevreux's, especially since they show identical features. Hunt's diagnosis of them as "not *T. sylvaticus*" disposes of the "puzzling discrepancy" in the published reports of the pleopods up to 1925. Hunt's remarks are very much to the point

and it is unfortunate that the same question should have been revived by the specimens which Stephensen (1935) and Shoemaker (1936) have described.

Stephensen figures specimens of what he calls *Talitrus sylvaticus* from the Marquesas Islands. In using Hunt's key he has rightly decided that his specimens are not *T. dorrieni* and has come to the conclusion that there is no "important difference" between them and Sayce's. I would dispute this on the grounds I have already given for considering Sayce's specimens identical with Hunt's.

Shoemaker (1936) figured a specimen of *T. sylvaticus* from the United States and his figure of the outer lobe of the maxilliped leaves no doubt that his specimens also differ from those at hand from New Zealand, from Hunt's and Sayce's. (Schellenberg, 1942, reproduces these figures.) Shoemaker remarks that "Chilton . . . figures [the maxilliped outer] plate as narrow and distally acute with the inside margin concave. This is a very peculiar discrepancy which I cannot account for." Shoemaker's and Stephensen's figures are identical for all appendages, particularly the maxilliped palp. The outer plate of the maxilliped figured by Shoemaker cannot be considered to answer to Sayce's specifications of "rapidly narrowing." Furthermore, I am convinced Sayce would not have overlooked a 3rd pleopod such as they figure to the extent of saying "no vestige of a third pair is to be found." Specimens in Chilton's collection from Fingal's Bay, like those from Hunter's Hill mentioned by Chilton (1923) as having pleopod 3 "quite small, with the branches vestigial," agree with Shoemaker's in the maxilliped. Thus the Norfolk and Fingal's Bay specimens, Shoemaker's and Stephensen's all agree very closely. They differ from *T. sylvaticus* in the maxilliped, both outer plate and palp; in the 3rd uropods; the 3rd pleopods (note the constancy in gross shape here again); the epimeral plates; the gills of pereopod 4; and the shape of the spine between the rami of uropod 1.

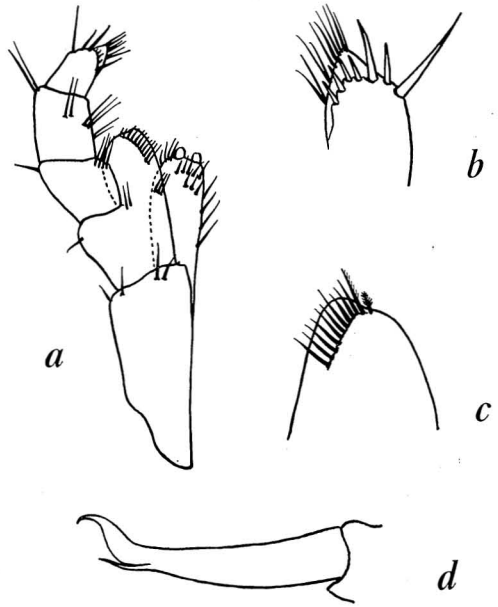


FIG. 3. *Talitrus pacificus* n. sp. a, Maxilliped; b, maxilliped, tip of palp; c, maxilliped, end of outer plate; d, uropod 1, inter-ramal spine.

Reid (1947) figures *T. dorrieni*, *T. alluaudi* and *T. hortulanus*, each with only one long spine on the peduncle of the third uropod, and throughout the genus the number of large spines on the peduncle seems reasonably constant. Hunt's specimens and those from New Zealand show one spine. Shoemaker's and Stephensen's show three. Chilton's specimens have both, but those with maxillipeds as in Hunt's *T. dorrieni* figures have one spine and those with the Marquesan type maxillipeds have three.

The epimeral plates figured by Stephensen and Shoemaker differ from those figured by Hunt and those of the New Zealand specimens.

The long spine, commonly found in Talitridae, between the rami of the first uropod is extremely distinctive in Shoemaker's and Stephensen's specimens because of its terminal spur and accessory blade. The spine in *T. sylvaticus* and *T. kershawi* is quite simple with only the slightest curving of the tip.

The gill of peraeopod 4 in the New Zealand specimens, in Chilton's specimens which I have referred to *T. sylvaticus*, and in Hunt's specimens is long, goosenecked and cleft at the tip. In Sayce's it appears to be the same. In Shoemaker's and Stephensen's it is blunter and much more bulbous terminally.

I have illustrated for comparison the maxillipeds and inter-ramal spines of *T. sylvaticus* Haswell (Fig. 2e-g, k); *T. kershawi* Sayce from Mt. Wellington, Tasmania [Chilton Collection Tray 152/1-5 (H₁-H₅)], (Fig. 4); and *T. pacificus* from Norfolk Island (Fig. 3).

It is my opinion that the specimens described by Haswell as *T. sylvaticus* are identical with those later described by Sayce (1909), Chilton (1916), Hale (1929), and Ruffo (1948) as *T. sylvaticus*; with those described by Hunt (1925) and Rawlinson (1937) as *Talitrus dorrieni*; and with those described by Schellenberg (1934) and Reid (1947) as *Talitroides dorrieni*. The specimens described by Stephensen (1935) and Shoemaker (1936) under the name *Talitrus sylvaticus* belong to a different species which is here described as new, pro forma.

***Talitrus* (*Talitroides*) *Pacificus*, n. sp.**

Fig. 3

[non] *Talitrus sylvaticus* Haswell. Stephensen, 1935: 19-24, figs. 1-3. Shoemaker, 1936: 60-64, figs. 1-2.

Maxilliped outer plate distally rounded, with oblique row of several setae, across plate distally and set in a little from inner distal margin. Palp has distal lobe set off by row of 4 or 5 spinules but not separated from third segment. Uropod 1 has large inter-ramal spine with terminal spur, a small needlelike accessory blade at base of spur. Uropod 3 has 3 large spines on peduncle. Gill of fourth peraeopod terminally blunt and bulbous. Pleopods 1 and 2 normal, rami well developed with real or apparent segmentation, segments bearing plumose setae. Pleopod 3 has peduncle somewhat reduced, with a single vestigial

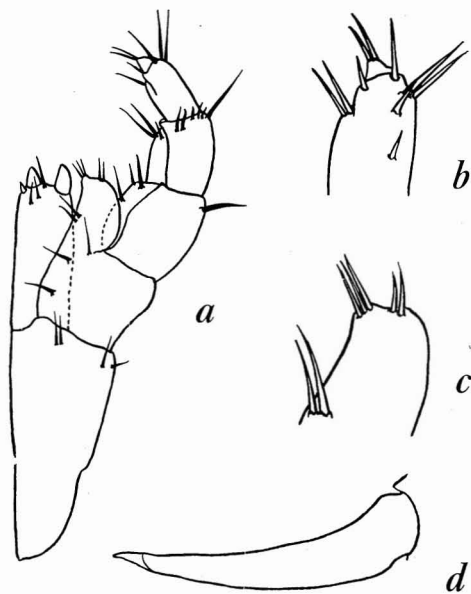


FIG. 4. *Talitrus kershawi* Sayce. a, Maxilliped; b, maxilliped, tip of palp; c, maxilliped, end of outer plate; d, uropod 1, inter-ramal spine.

ramus consisting of short rounded knob, with or without single terminal seta. Otherwise similar to *Talitrus sylvaticus* Haswell.

TYPES: Slides 11-15 (N₁-N₅), Tray 56, Chilton Collection, from Norfolk Island; deposited at Canterbury University College.

LOCALITIES: Norfolk Island; Fingal's Bay, New South Wales, Australia (Slides 11-14 [F₁-F₄], Tray 127, Chilton Collection).

DISTRIBUTION: Norfolk Island; Australia; Marquesas Islands (Stephensen, 1935); United States of America (Shoemaker, 1936).

REMARKS: Fuller descriptions and figures of this species will be found in the cited papers by Stephensen (1935) and Shoemaker (1936). Since I have not seen their material and they do not catalogue it, I have had to nominate as type a series of slides in the Chilton Collection.

SUMMARY

The generic status of *Talitrus* is discussed. It is considered that *Talitroides* deserves sub-

generic rank only, as of value in designating the truly terrestrial species. A key to species of *Talitrus* is given. *Talitrus* (*Talitroides*) *sylvaticus* Haswell is recorded for the first time from New Zealand, described and figured. It is considered that *Talitrus dorrieni* Hunt is synonymous with *Talitrus sylvaticus* Haswell and that specimens attributed to *Talitrus sylvaticus* by Stephensen (1935) and Shoemaker (1936) belong to a new species for which the name *Talitrus* (*Talitroides*) *pacificus* is proposed. This species is formally described and type material from Norfolk Island nominated. Brief references are made to other Pacific material belonging to this genus in the Chilton Collection.

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